



**Second Integrated Ocean Observing System (IOOS)
Regional Coordination Workshop**

**Tradewinds Island Resort, St. Petersburg, FL
October 23 to 25, 2007**

Table of Contents

EXECUTIVE SUMMARY	1
TUESDAY AFTERNOON: INTRODUCTORY PLENARY SESSION	2
TUESDAY AFTERNOON: BREAKOUT SESSION 1	3
Conceptual design track	3
DMAC plan track	4
WEDNESDAY MORNING: 8:00 A.M. PLENARY SESSION	4
WEDNESDAY MORNING: BREAKOUT SESSION 2	5
A. User needs	5
B. Role of modeling at the regional level	6
C. Optimizing designs	7
D. Regional data interoperability	7
WEDNESDAY MORNING: 11:00 A.M. PLENARY SESSION	8
WEDNESDAY AFTERNOON: BREAKOUT SESSION 3	8
A. User needs	9
B. Role of modeling at the regional level	9
C. Optimizing designs	10
D. DMAC plan track	10
THURSDAY MORNING: PLENARY SESSION	11
Workshop summary	11
DMAC track summary	12
Linking regional design efforts with interagency programs	13
Thoughts and questions	13
Next steps and action plan	13
APPENDIX 1: BREAKOUT SESSION 1 – MODEL INVENTORY NOTES	15

Second Integrated Ocean Observing System (IOOS) Regional Coordination Workshop:

Executive Summary

St. Petersburg, Florida • October 23 to 25, 2007

The Second IOOS Regional Coordination Workshop was held October 23 to 25, 2007, in St. Petersburg, Florida. Approximately 65 individuals attended the workshop, representing the 11 regional associations (RA) and several federal agencies and offices, including the National Oceanic and Atmospheric Administration (NOAA), Ocean.US, the U.S. Geological Survey (USGS), and the U.S. Army Corps of Engineers. The workshop focused on the development of two cornerstone documents for the RAs: regional coastal ocean observing system (RCOOS) conceptual designs and regional data management plans, with the agenda split into two different tracks, one for each focus. To guide the discussions, the steering committee developed two discussion papers, one on the development of RCOOS conceptual designs and the other regional data management plans, with each delivered to participants before the workshop.

Specific outcomes from the workshop included the following:

- Formation of a working group to develop a design template for version 1.0 of RA conceptual designs
- Agreement that each region will submit a first draft of its conceptual design to the NOAA IOOS Program by December 20, 2007
- The first gathering of RA data management representatives
- Circulation of the data management plan discussion paper among the regions for final review and adoption as the template for regional data management plans, which will also serve as the data management component of the business plans

The workshop provided opportunities for participants to gather in small breakout groups, as well as convene in plenary sessions to share ideas and tie the two tracks together. Key themes repeated during these sessions included the following:

- Speaking in one voice with a common vocabulary
- Improving federal agency involvement in the regions
- Improving federal/regional communication and coordination
- Creating a template for developing conceptual designs
- Developing performance metrics, noting the difficulty in doing so
- Establishing priorities for developing an RCOOS
- Moving forward with developing conceptual designs and Data Management and Communications (DMAC) plans
- Leveraging existing work and sharing lessons learned

The workshop agenda, presentations, and breakout session report-outs are available on the workshop website at www.csc.noaa.gov/IRCW/.

TUESDAY AFTERNOON: INTRODUCTORY PLENARY SESSION

The workshop opened with a welcome from workshop moderators Molly McCammon, executive director of the Alaska Ocean Observing System and chair of the National Federation of Regional Associations (NFRA), and Geno Olmi, regional association coordinator for the NOAA Coastal Services Center. McCammon provided a brief overview of the objectives of the workshop:

- Develop guidance for RAs on RCOOS conceptual designs and regional data management plans
- Develop specific recommendations to link regional plans with the national program
- Examine common concerns, major issues, and potential solutions

She also reviewed the progress made in the past year since the 2006 Chicago regional coordination workshop, and the ways in which the lessons learned in Chicago guided the planning for this workshop ([*Charge to the Working Groups*](#)).

Tuesday's opening plenary session featured three talks aimed at setting the stage for the workshop. Mary Altalo, director of Ocean.US, spoke about the interagency role of Ocean.US and its work plan focus for fiscal year (FY) 2008, including coordinating federal agency IOOS efforts, organizing the 2007 Maritime Domain Awareness Summit, and representing IOOS at the international level. Zdenka Willis, director of the NOAA IOOS Program, provided an overview of the past year's activities and plans for moving forward, with particular emphasis on funding priorities, processes, and future funding mechanisms ("[NOAA's Upcoming Priorities](#)"). Concluding was Captain Chris Moore, deputy director of the NOAA IOOS Program, who presented information on the NOAA IOOS Data Integration Framework (DIF) and the DMAC standards adoption process ("[NOAA's IOOS Program DIF & Standards](#)").

Following the three presentations, there was a brief question and answer session. The responses stressed several key points, including the importance of coordination at both the regional and international levels, tapping into existing knowledge, and receiving regional input. There were several questions about federal office roles and responsibilities, particularly regarding regional IOOS development. Both Altalo and Willis affirmed their commitment to supporting regional efforts, with Ocean.US addressing interagency issues and NOAA taking the lead in funding regional efforts. Altalo also commented that the regions, through NFRA, can better engage other agencies if they speak with "one voice" and work through the Interagency Working Group on Ocean Observations (IWGOO) to outline their needs.

Olmi summarized the regional capacity and priorities as indicated by the FY 2007 funded projects, FY 2008 RA development proposals, and the IOOS Regional Observation Registry ("[Regional Capacity Overview](#)"). The presentation gave a general indication of regional observing capacity and applications, priority issues, and investment priorities. McCammon then reviewed the charge for the three breakout sessions and finished the opening session by calling on the regions to share success stories.

- Mid-Atlantic Coastal Ocean Observation Regional Association (MACOORA) members talked about how they worked with a local energy company, providing forecasts for Tropical Storm Ernesto that guided the company's distribution of resources before the storm event.

- The Pacific Islands Integrated Ocean Observing System (PacIOOS) shared the development of a beach safety website that predicts onshore and offshore wave conditions, directing people to beaches that have lifeguards.
- The Southern California Coastal Ocean Observing System (SCCOOS) worked with local water quality officials to create a water-quality monitoring network and plume trajectory model during a recent outfall diversion project.
- The Central and Northern California Coastal Ocean Observing System (CeNCOOS) partnered with the NFRA and the Coastal States Organization (CSO) on a workshop titled, “Making Use of Ocean Observing Systems: Applications to Marine Protected Areas and Water Quality.”

TUESDAY AFTERNOON: BREAKOUT SESSION 1

The objective of this session was to develop comments on the purpose and content of the two discussion papers on conceptual designs and DMAC plans. Workshop participants were divided into four groups before the workshop to achieve broad regional and agency representation. Three of the groups discussed the conceptual design discussion paper and the last, composed of individuals involved in DMAC work, focused on the data management plan discussion paper.

Conceptual Design Track (*Session Reports – [Session 1a](#), [Session 1b](#), [Session 1c](#)*)

Each of the three conceptual design groups addressed the same set of questions intended to guide the discussion by focusing on the discussion paper content. The questions asked were as follows:

1. Does the paper provide a good framework for developing RCOOS conceptual designs?
2. Are there any essential elements of a conceptual design that are missing or any major gaps (keeping in mind that DMAC will be modified based on results of the DMAC working group)?
3. Does a well-developed conceptual design provide the foundation for building regional systems and the relationships between the main components of a system (observations, modeling and analysis, DMAC) and for the integration of the systems into a national network? If not, specify the missing pieces.
4. Is the process laid out for developing conceptual designs doable at this stage? Should the paper clarify phases for development as described in section 2.2.3 of the discussion paper?
5. What are the next steps?

Among the key outcomes from these discussions was agreement on the need for a conceptual design template, along with the understanding that some urgency exists for moving forward. Developing conceptual designs based on a template would be an important first step of an iterative process, help inform NOAA and other federal agencies, and connect and coordinate regional plans and priorities with national efforts. The template should define terms and have common elements, allowing each regional design to share a consistent look while allowing for regional differences. While the discussion paper is a good start on a template, there are several elements that are missing, such as the process for modifying the design and the interaction and interface between regions.

The three conceptual design breakout groups also discussed the role of user needs, priorities, and performance metrics. According to some, the design starts with identifying user needs and these needs should drive the design process. Some discussion centered on how the template will create a broad process for setting regional priorities and how common priorities among the regions are likely to be national priorities as well. Some acknowledged that identifying performance metrics might be difficult at this stage of regional association development but would ultimately be a reasonable concept to begin working on.

There was concern about how the RCOOS conceptual design meshes with other RA documents, particularly the business plan. Some participants questioned if the business plan was the conceptual design, while others thought that the conceptual design fit as a component within the business plan. This issue, raised several times throughout the workshop, was left unresolved. Likewise, there were questions about which plan was the most appropriate to address outreach and education efforts. The general agreement was that outreach and education needed to be in one of the plans and could possibly be included as part of the user needs section. Most comments also indicated that industry, considered one of many user groups or partners, did not need to be singled out in the conceptual design.

DMAC Plan Track (*Session Report – [Session 1d](#)*)

The data management group discussed the suitability of the data management discussion paper as a template for a high-level assessment and synopsis of the state and plans of the RA's DMAC systems. The group noted that the discussion paper was not a true data management plan but rather a strategic document that gives a high-level description of the current system and near-term plans. As such, the paper identifies gaps, useful collaborations, opportunities for transferring technology, and elements requiring supplemental support. The group agreed that the discussion paper is a good start on a template for regional DMAC plans and that these plans should be acknowledged as fulfilling the DMAC portion of the RA business plan. Using a template will facilitate review of the plans and comparisons between the RAs. The regional DMAC community will move quickly to modify the template into an agreed-upon final form.

WEDNESDAY MORNING: 8 A.M. PLENARY SESSION

Wednesday began with a report-out on each breakout group's Session 1 discussions, followed by the charge for day two of the workshop. Following the report-outs, there was an opportunity for questions and discussion. Much of the discussion focused on creating a template for developing RCOOS conceptual designs and determining what elements it should contain. There were several comments that the regions need to move forward with developing these plans. Zdenka Willis reinforced this point, emphasizing that she needs to be able to communicate what IOOS is going to deliver to the nation and why the regions should receive funding. The more information that the RAs can provide to her, the better she is able to fight for resources. Others commented that developing a common format would allow comparisons of the RCOOS designs, particularly if there is agreement on common terms.

A first attempt at creating a design template incorporated a number of different elements:

- Priorities
- Identifying existing assets and performing a gap analysis

- The RCOOS subsystem
- Data management
- Outreach and education
- Performance metrics
- Research and development

A significant amount of discussion involved developing performance metrics. There was broad agreement that the RAs need to develop performance metrics; however, there is uncertainty on how to do this and what they should be, given the early stages of RCOOS and RA development. In addition to the discussion on performance metrics, there were questions about where to address outreach and education, whether in the conceptual design or in the business plan. Concerns were also expressed that some might view the RA and RCOOS as separate entities, and with the RAs being required to develop a number of different plans, they need some guidance on how they all fit together.

WEDNESDAY MORNING: BREAKOUT SESSION 2

For the second breakout session, the workshop steering committee again assigned participants to one of four groups. In this session, each group would address one of the following topics:

- A. User Needs, Technical Requirements, and Establishment of Priorities – To develop general understanding of effective methods for meeting user needs from the initial identification step to the actual delivery of data or products.
- B. Role of Modeling at the Regional Level – To develop a general agreement of the role RAs will play in modeling.
- C. Optimizing Designs – To develop general agreement on the processes for determining the optimal design for RCOOS observing subsystems.
- D. Regional Data Interoperability – To develop general understanding of the interface between DMAC plans and the RCOOS designs, the baseline capacity for regional interoperability, etc.

A. User Needs (*No Session Report Presentation*)

The user needs group identified a number of techniques to address user needs, such as holding meetings and workshops, having users on the RA board, or setting up a stakeholders' council or advisory group. Several comments stressed the importance of spending time listening to users and stakeholders, not just asking them questions. Managing user/stakeholder expectations was identified as an important issue, because if the RAs cannot deliver on what they promise, they risk losing the support of users and others. One suggestion: RAs should narrow their focus and identify what they have and how the RA can fill gaps.

One valuable technique to direct priorities is to use existing needs assessments compiled by relevant programs. An example of this is using the priorities established in state management plans to guide the RA. Funding availability and sources may also guide the establishment of priorities. Regardless of the technique used, the process for setting priorities should be open and transparent. Pilot projects and prototypes, even those developed in other regions, are also good tools for showing the types of products the RA can provide. The group finished with a discussion

on working with the private industry sector. While there was a reluctance to single out the private sector from other users, there are legitimate questions about maintaining the public good while providing opportunity for the private sector to create value-added products.

B. Role of Modeling at the Regional Level *(No Session Report Presentation)*

The modeling group started with a quick inventory of the different models that were currently in use by the regions (Appendix 1). The question of whether RAs should have operational circulation models led to two additional questions: what defines operational (does sustained support determine if it is operational) and what is an RA model (is it funded by the RA or something the RA is running)? A larger issue was whether RAs need to have an operational regional modeling center. Operational costs of a modeling center are high but such centers will become more important as the number of models being run increase.

The group discussed the role of modeling centers in regard to running nested models, asking the following questions: will every RA need to run nested domains independently, can large models be run outside of the region, and who will watch the output? Other topics discussed included 1) the value of having each region establish a “forecast center,” 2) models serving as product generators that demonstrate value added, and 3) liability issues with forecasts.

During the session, the modeling group tackled how to define the relationship between the research community and the IOOS operational community. RAs could serve as a bridge between the two groups, with RAs facilitating modeling by providing observations and model output to modelers, and the research community providing test-beds to evaluate operational models. Another question asked how to improve relations with federal partners, such as the Coast Guard, and whether the RAs can provide the data necessary in an operational sense. Building connections with the National Weather Service’s (NWS) Weather Forecast Offices (WFO) was an area that regions could use to strengthen ties with federal agencies.

There was a discussion on the national responsibility for large-scale models, with questions regarding the distribution of global ocean model outputs to users and whether costs for such models were part of the national backbone. One participant noted that without global models providing boundary conditions, there cannot be regional models.. One recommendation was for the RAs to provide a list of regional models that rely on larger model runs to encourage national efforts, as well as providing feedback on the performance of global models.

Other topics discussed in the session were Observing System Simulation Experiments (OSSE), performance metrics, the role of modelers, and the importance of describing the products that users are getting from models. The group thought OSSEs are too difficult and expensive for the relatively immature systems in place, and a luxury given that the RAs need to show success now. One role mentioned for modelers was to advocate for more discussions across agencies. The current difficulties in establishing performance metrics included credibility issues resulting from a lack of standard methods for validation. However, while the information on the products derived from the models may be anecdotal, it is still valuable information.

C. Optimizing Designs ([*Session 2c Report Presentation*](#))

The optimizing designs group started by examining the techniques used to design systems. The most common method, termed “scientific intuition,” involves a combination of scientific knowledge, gap analysis, and user needs. There was an acknowledgment that other factors, political or administrative being examples, may affect the design of a system. Also, examining the value of existing assets (relating to location and density) can help in planning where to deploy additional assets, and NWS WFOs can provide valuable input on build-out recommendations. The group agreed that the limited use of OSSEs is primarily due to their expense and the time necessary to run them. A discussion on pilot projects identified them as one of the best ways to transition research designs to operational systems. Participants also mentioned the ability of pilot projects to expand to other regions, and discussed how they, when sustained, could be considered operational.

The group identified three main steps in the design process: 1) a conceptual design, 2) deployment and operation, and 3) evaluation, refinement, or growth. The initial conceptual design begins with the RA setting priorities, possibly followed by a pilot project, which promotes validation and verification of the design. Continual evaluation is a key part of the design process, leads to system optimization, and can identify research needs. It is important, however, that implementation and system build-out be flexible to meet each region’s resources and needs.

D. Regional Data Interoperability ([*Session 2d Report Presentation*](#))

This session focused on the interface between DMAC plans and the RCOOS designs, especially the need for developing baseline capacity for regional interoperability. The first question addressed by the group was the following: Should there be common baseline capability in each region for integrating regional data? “Baseline” was defined in terms of both metrics and service, “Metrics” in this case alluded to data provider participation in the region and registry of the available data. Baseline services included making data available on-line (via OPeNDAP/Web Service) and being end-to-end (discovery to access).

Participants also discussed effective methods for making data sets interoperable. Interoperable was defined as an automated and largely unattended system for selection-access-display of ocean data. The methods identified were as follows:

1. Specification of standard service interfaces – documentation of what is being served
2. Implementation of standard service interfaces
3. Use of cross-walks to mitigate changing vocabulary between RAs
4. Common or comprehensive catalog services

The group examined ocean data partnerships and discussed if the idea is transferable. Ocean data partnerships are agreements between data providers (e.g., state agencies, universities, nonprofits, etc.) to work together to make their data discoverable, accessible, and interoperable. The partnerships provide one mechanism for RAs to work with data providers in the region to make their data accessible. Generally, the partnerships are established by a nonbinding agreement and often rely on contributions of unfunded voluntary work. Some benefits of these partnerships are that data providers retain control over their data while participating in planning and coordinating

RA work plans, technical assistance is provided to providers to assist in making their data accessible, and regional support is built for data interoperability.

WEDNESDAY MORNING: 11 A.M. PLENARY SESSION

During the Session 2 report-outs, a number of comments and suggestions were offered on each group's discussion. One individual noted that trade shows and other industry associations can be good ways to engage users. The modeling report generated a number of questions and comments. One individual noted that models and observations should work to enhance NWS forecast office products rather than creating a separate forecast office, and that the regions could work in collaboration with existing NWS forecast offices to improve local forecasts. Another individual indicated that the NWS is currently understaffed, making it difficult to access and use the data, unless the NWS receives more support. The individual did see the need for a regional forecast center to keep feedback loops (re: models) open internally in IOOS. This was followed by a comment that there should be a concerted effort within the weather service to facilitate relationships between each region and in regard to issuing forecasts.

Additional comments noted that all RAs have multiple models, and that the regions are leveraging modeling and assimilation, since it is essential to their operations. One suggestion was to brand models and products of IOOS to raise awareness of its existence; however, one of the challenges of leveraging several different efforts is correctly acknowledging support. Another concern: the RAs face difficulties in developing conceptual designs without information on the national backbone assets and, in particular, the federal agencies' plans for those assets in the future. The last comment questioned where quality control fits into the system design and whether this should be a performance metric.

WEDNESDAY AFTERNOON: BREAKOUT SESSION 3

Session 3 focused on relations between federal agencies and the regions. Workshop participants remained in their Session 2 groupings and addressed the session questions within the context of their Session 2 topics.

- A. The user needs group examined how RAs and federal agencies can work together to minimize duplication and ensure that user needs, requirements, and priorities meet regional and national needs.
- B. The modeling group discussed how models can improve forecast products and how to transition candidate models to an operational capacity.
- C. The optimizing designs group looked at the development of regional designs with respect to regional and national requirements (and vice-versa).
- D. The DMAC group, charged with developing recommendations for how regional and federal DMAC efforts should be coordinated, addressed a series of questions based on the premise that national-level DMAC has provided a "top-down" forcing function for regional DMAC development, while the regions are working, in a large part, from a bottom-up perspective.

A. User Needs (*No Session Report Presentation*)

The following themes dominated the discussion in the user needs group: comparing regional and national priorities, federal participation in the RAs, increasing federal agency engagement in IOOS as a whole and in the regions specifically, and issues involving communication and coordination between the federal agencies and the regions. The session started with the observation that national and regional priorities may be the same, and if the RAs can articulate these shared priorities they can promote partnership with federal agencies. Federal participation in the RAs, while varied across regions, was viewed as very important and beneficial, because it fosters communication, helps forge new relationships, and facilitates RA involvement in other regional collaborations.

Even with the benefits of direct federal agency engagement with the RAs, individual staff member interest is often what drives this participation. The group identified the lack of support for regional involvement from federal agency leadership as one impediment to greater federal agency participation. One solution to this is working through the IWGOO to show how IOOS can contribute to agency missions, thereby fostering agency interest in working with the regions. At the same time, RAs could pursue a “bottom up” approach and collaborate with the agencies by connecting with their priorities and engaging with and providing products to agency stakeholders at the regional and local level. Some regions find it hard to engage regional line offices, especially for agencies whose regional boundaries differ from those of the RA. One recommendation to address this problem is for NFRA to approach the IWGOO with a request for a list of federal agency points of contact for each region.

B. Role of Modeling at the Regional Level ([*Session 3b Report Presentation*](#))

The session began by tracing the steps from research model to operational model to product. Traditionally, it is the role of the federal agencies to develop and run operational models, although in some cases, it may be more appropriate for the RA to run the operational model. The group identified several different approaches for making these steps, listing examples from the Navy, a European model, and the Canadian Department of Fisheries and Oceans. The modeling group discussed communication at length, and many expressed the need for a unified voice that could provide a cohesive statement of RA needs to federal agencies. The RAs need a better way to communicate their needs to federal agency officials. Building connections with the NWS forecast offices was offered as one method for making regional forecast products available.

One of the problems facing regional modeling efforts is effectively informing the many end users about the models and their products. Suggestions to address this included developing a regional model inventory and formalizing a system identifying regional modeling points of contact. Working with the Modeling and Analysis Steering Team (MAST) was encouraged, with communications enhanced by the creation of an NFRA modeling group with a regional representative on MAST. MAST could in turn provide feedback on the regions’ conceptual designs.

Developing a joint conceptual design for models between the regions and the national backbone was suggested as a way to coordinate regional and national efforts. This would communicate federal agency plans to the regions, thereby helping to avoid duplication and coordinating how to best serve common user groups. These efforts should include more than just NOAA, with the

IWGOO promoting wider agency involvement. During the discussion, there were questions on how regional plans fit into national plans, what feedback the RAs will receive on the conceptual designs, and how the regions can enter a dialogue with federal agencies about national needs.

In discussing the need for a regional conceptual design template, the group identified several advantages to having common elements in the document. Primary among these were the ability to look across the regions and pull out commonalities (which would benefit NOAA's budget justification requests), identifying efficiencies of scale (are there things best achieved on a "super-regional" scale), and enhancing the ability to transfer processes, products, and lessons learned from one region to another.

C. Optimizing Designs ([*Session 3c Report Presentation*](#))

This group identified many of the same issues as the others regarding relations between the federal agencies and the regions. While there are success stories in which federal agencies are working with the RAs at the regional level, many of these are a result of the efforts of specific individuals and vary across the regions. The challenge, as identified by the group, is communicating these successes up through the agencies and to the IWGOO. Increasing federal engagement with the RAs will require approaching the problem from two directions; agency leadership needs to communicate to their regional offices the importance of working with the RAs, who must in turn engage the agencies' regional offices by focusing on their regional priorities. The RAs can encourage federal participation by identifying and working on topics of concern to the agencies, and the regional conceptual designs can be a useful communication vehicle to the federal agencies.

As was mentioned by other breakout groups, the IWGOO can play an important role in building the connections between the regions and federal agencies, but the RAs need to educate the IWGOO membership about their agency engagement in IOOS work. To achieve this, the RAs could provide IWGOO members with a list of agency field representatives currently working with the RAs. Conversely, the IWGOO could provide a list of regional agency contacts to the RAs. In addition, the RAs have expressed their desire to know proposed federal build-out plans for federal agency assets and think the IWGOO could serve as a mechanism for sharing this information.

Another topic discussed was the value, for the RAs, of participating in some of the emerging regional ocean governance alliances, since in many instances these alliances achieve immediate status and credibility with federal agencies. There were also questions about defining the national backbone, specifically, whether there is a reluctance to identify who is part of the national backbone and if the lack of commitment on the part of some agencies resulted from their uncertainty about whether IOOS affiliation was a good thing. The group also agreed that there are advantages to developing common elements in all the RA conceptual designs, mentioning specifically the identification of roles and the benefits from economies of scale.

D. DMAC Plan Track ([*Session 3d Report Presentation*](#))

The DMAC breakout split the group into two, with one group composed of regional data managers and the other representing NOAA offices involved in data management activities. The session format had the regional group address a number of questions, followed by the federal

staff response. On the question of what aspects of the national DMAC guidance have been effective, the regions thought the IOOS Guide for Data Providers and Executive Summary were valuable because they provide targeted goals for IOOS and serve as a starting point for identifying solutions for specific technology problems.

The regional group identified several gaps in the national-level DMAC guidance. These include the following:

- Insufficient technical guidance to ensure IOOS compliance
- Failure to address some issues such as liability or information security (who is responsible? data owner, provider, etc.)
- The role of quality control is not well defined in the document (who and how)
- Basic reference architecture implementations are not addressed

In discussing national infrastructure and service needs, the regional group thought establishing community-wide relevance would generate “buy-in.” Regarding whether federal agencies could provide a trusted digital archive, which would take care of some liability issues, there were questions whether the federal agencies are prepared for this. The group also identified the need for having national-scale data query available on some level, creating a centralized code repository (actual code to deal with data), an information portal for resources, and validation of compliance for products and services. The federal group members responded that they thought the guidance was too technology-centric, gave no guidance on implementation, and was somewhat out of date.

Security was raised as an issue, since NOAA has not blessed Open-source Project for a Network Data Access Protocol (OPeNDAP) for security reasons. While there now is a procedure for using OPeNDAP, this is a short-term solution and hooking into other servers will be an ongoing issue that will need more discussion.

THURSDAY MORNING: PLENARY SESSION

Workshop Summary ([Summary Presentation](#))

The last day began with a summary of the workshop’s themes and issues. Molly McCammon noted that the conceptual design discussion paper covered the basics, and she identified some missing elements, such as a statement of problem, gap analysis, and interfacing between regions. Several other topics were mentioned that need further discussion:

- Defining the term “regional operating centers”
- Establishing performance metrics
- Model skill assessment
- Where to best address education and outreach in RA plans
- Agreeing on a time horizon for the designs (5 to 10 years)

A working group of volunteers agreed to revise the template and circulate it back to the regions by November 2, 2007.

McCammon then outlined some key points raised in the user needs group discussions, including how the regions have engaged a variety of users, identified needs for data products, and are delivering products. With this base of knowledge, federal agencies should look to the RAs for assistance on user outreach. Emerging regional ocean governance efforts are a potential avenue for greater collaboration with federal, regional, and state efforts as these efforts will require regional ocean data to support their policy decisions. NFRA will work with the IWGOO to identify ways to improve federal/regional collaborations.

All regions have some modeling activities, and NFRA is compiling an inventory of models currently being developed or operated at the regional level. A modeling inventory must be set up so it is easy to maintain with standardized terminology to keep the regions from “reinventing the wheel.” As with the other groups, the modeling group stressed the importance of improving communications between the regions and federal agencies. The types of information that need to be shared include federal plans for upgrading models and regional needs on modeling output. A discussion should be held on how regional models fit into the national efforts. The modeling group also recommended establishing an NFRA modeling subcommittee that could work with the MAST.

The discussions from the optimizing designs group identified “scientific intuition,” essentially using the best professional judgment of the system designers, as the most common technique currently used for optimizing designs. Presently, OSSEs are too expensive and difficult to perform to be used extensively as system optimization tools. The group also discussed the importance of leveraging existing infrastructure; however, to do this requires that the regions know proposed federal build-out plans.

In closing, McCammon listed several other issues that need attention in order to move forward. These include the following:

- Developing common messages and an agreed-on vocabulary
- Finding ways to brand or market IOOS
- Reaching agreement on specific plans the RAs need to develop

This last issue stems from the uncertainty over the number and status of the various plans (and different names for what may be the same plans) currently required of the regions.

DMAC Track Summary ([*Summary presentation*](#))

Matt Howard, chair of the RA DMAC Caucus, reviewed the key points from the DMAC track break-out sessions. The group thought that the DMAC plan discussion paper is a good start on a template for use as a high-level strategic planning document, and that having a common template is valuable for self-assessment, planning, and gap identification. During the second break-out session on regional data interoperability, the group considered initial definitions of baseline capability for integrating regional data, interoperability, and the value of regional data partnerships. Identifying what information should be transported from the provider to the user to define usability is key, and is an issue that the NOAA IOOS Program is taking on.

The session on federal-to-regional relations discussed the value of the DMAC plan and its deficiencies, along with information technology gaps best addressed by super-regional activities.

There was concern that quality assurance/quality control, which is critical to the success of IOOS, needs to be addressed. A major benefit of the DMAC sessions was providing the RA DMAC representatives their first chance to meet and network. Another key outcome was agreeing to refine the data management discussion paper into a template for use by regions in fulfilling the requirements for the business plan.

Linking Regional Design Efforts with Interagency Programs

Thursday's session continued with Mary Altalo outlining the Ocean.US efforts to link regional designs with interagency programs. Altalo began with a summary of the Ocean.US work plan tasks supporting regional IOOS development, coordination, and governance, along with some of the other responsibilities of the office at the national and international level. She suggested that NFRA submit an issue paper to the IWGOO requesting to be included on a meeting agenda to give a presentation on regional activities. She mentioned the importance of providing the IWGOO membership with a list of regional points of contact. When asked if there were any federal agencies doing conceptual IOOS plans, she replied that NOAA was the only one and reiterated the importance of making connections with those agencies that have IOOS-relevant efforts.

Thoughts and Questions

Zdenka Willis provided some concluding thoughts, stressing the importance of the RAs taking action and moving forward with conceptual designs, and recommending that a first draft be submitted to NOAA by December 20, 2007. She pointed to the need for coordination and that all the regions must develop and mature through a collective effort. Willis pledged that NOAA IOOS would be open and transparent. She also mentioned that the data integration plan was available on the NOAA IOOS website. When asked about NOAA build-out plans for the future, Paul Moersdorf, director of NOAA's National Data Buoy Center (NDBC), answered that until assessments were completed supporting a gap analysis that would inform planning efforts, there were no plans for significant enhancements to the observing system. Willis indicated that NOAA would follow up with information on NOAA's plans for observing systems and modeling.

Next Steps and Action Plan

The workshop closed with Molly McCammon leading a discussion on what steps to take next. She identified the working group tasked with developing the regional conceptual design by November 2, 2007. Each RA would then use this template to create Version 1 of their designs and submit them to the NOAA IOOS Program by December 20, 2007. This led into a discussion on federal/regional communication and coordination, focusing on facilitating communication with the NWS, better communication between NDBC and the regions, development of performance metrics, and ensuring funding processes are open and transparent by posting successful proposals on a website so they're publicly available. Part of better coordination and communication is reaching a collective agreement on what plan the regions need to complete, whether it is a strategic plan, business plan, or conceptual design.

In addition, there were a number of other topics addressed during the last session:

- Creating working groups on specific thematic issues (e.g., ecosystem-based management, coastal inundation, navigation safety)
- Establishing a metadata expert team to look at IOOS vocabulary

- Exploring the concept of regional operations center in greater detail
- Developing mechanisms to coordinate press releases between the regions and NOAA when highlighting IOOS activities.

There was also some discussion about helping DMAC chair Anne Ball work on quality assurance/quality control issues. In addition, NFRA will develop an issue paper to submit to the chair of the IWGOO requesting the opportunity to discuss regional issues and collaborations.

APPENDIX 1

Breakout Session 2b: Role of Modeling at the Regional Level – Model Inventory Notes

AOOS: three RCOOSs: Gulf of Alaska RCOOS – 3 operational models: WRF, ROMS with MPZ module, SWAN wave model

CaRA: two models: WRF (weather) done by NWS (UPRM), ADCIRC for coastal inundation (in collaboration with Dave Hill)

CenCOOS: ocean circulation models (nested). ROMS efforts, Navy (John Kindall, etc. 5 yr. program – NCOM and ICOM), USGS runs sediment transport models. Need large-scale models as basic inputs to smaller scale models. Model diversity is more important than biodiversity? Imbedded ecosystems, trajectory modeling – need to get physics correct.

GCOOS: constituents used predicted models for river discharge (ACOE), storm surge, Navy wave model, hurricane forecasting, Navy circulation models. ADA models to drive circulation models on shelf. PORTS has model system from NOS, ports (Corpus Cristi, etc.) around the Gulf have unique circulation models not sanctioned by NOAA. Version of POM run operationally from NW Gulf 2x/day. Similar model for West Florida Shelf – COMPS. Three private models: two POM-based, one feature model. Industry buys model results. NRLs, IAS nowcast/forecast systems.

GLOS: focus on nearshore issues associated with public water supplies. 2-D circulation model similar to Princeton Ocean Model, wave model, WRFs at NWS

MACOORA: hundreds of models for bays, estuaries. Three atmospheric models: SUNI, MM5, and RAMs model of weather flow. Series of circulation models: Harvard system, POM, ROMs model coupled to ecosystem models and sediment transport. FE models??

NANOOS, CenCOOS, SCCOOS: Bill O'Reilly's transformation model in a forecast mode for wave transformation (also in Guam and Hawaii)

NERACOOS: OSEEs for design, PO model. GoMOOS has POM models for circulation, SWANN for waves.

PacIOOS: WRF, MM5 for atmosphere forcing on circulation models, 2 circulation models: HYCOMM (NCOM) on island domain, Princeton Ocean Model on nearshore...open boundary conditions from Navy. Wave watch in nested mode – goes into beach safety – incepts operational wave model. Coupled WRF-ROMs in future?

SECOORA: circulation EFSIS, West Florida Shelf (COMPS – ROM and HYCOMM), UNC model, a couple inundation models (UNC, others), ecosystem model out of UNC. About 100 models: FLDEP has a model inventory that estimated 80 models for Florida alone. Downscaling from HYCOMM for open boundary conditions.

SURA SCOOP: inundation models. East Coast geographical scope.